

REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 13-15 and 17-19 are presently pending in the present application. Claims 13 and 14 have been amended, and claims 1-12 and 16 have been canceled without prejudice or disclaimer by way of the present Amendment. No new matter is introduced by this amendment. (See e.g., paragraphs [0031]-[0033] and Tables 1 and 2.)

In the Office Action, claims 13 and 14 were rejected under 35 U.S.C. §112, second paragraph; claims 1, 2, 4-8, 10-15, and 17-19 were rejected under 35 U.S.C. §102(b) as being anticipated by *Yamamoto et al.* (U.S. Patent Nos. 6,824,601 or 6,767,658); and claims 3, 9, and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Yamamoto et al.* in view of *Ueda et al.* (U.S. Patent No. 5,985,427) or *Hitachi Tool* (JP 2001-341008).

Regarding the rejection of claims 13 and 14 under 35 U.S.C. §112, second paragraph, the Office Action rejects these claims as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 13 and 14 have been amended to address the indefiniteness rejections raised in the Official Action by specifying the positional relationship between the substrate, the first layer, the second layer, and the third layer. No new matter has been entered. (See, e.g., paragraphs [0031]-[0033] and Tables 1 and 2.) Accordingly, Applicants request the withdrawal of the indefiniteness rejection.

Regarding the rejection of the claims under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), it is noted that pending independent claim 13 has been amended to incorporate the subject matter of dependent claim 16, and therefore the anticipation rejection has been rendered moot. Regarding the obviousness rejection under 35 U.S.C. §103(a), the Applicants respectfully request the withdrawal of the obviousness rejection for the reasons set forth below.

Applicants submit that the Office Action fails to establish a *prima facie* case of obviousness, since there is no evidentiary support for the conclusion that the features recited in the claims were known at the time of the present invention, and since the claimed invention provides unexpected results not achieved by nor suggested by the applied art. The Applicants request that such evidentiary support be placed on the record, or the obviousness rejections withdrawn.

Independent claim 13 recites “[a] coated cutting tool equipped with a substrate and a coating formed on said substrate, wherein: said coating is formed from at least two coating layers; a first layer of said coating layers contains a compound formed from elements Al and Cr and at least one element selected from a group consisting of carbon, nitrogen, oxygen, and boron; a second layer of said coating layers contains a compound formed from: at least one element selected from a group consisting of a group IVa element, a group Va element, a group VIA element, and Si; and at least one element selected from a group consisting of carbon, nitrogen, oxygen, and boron; and at least one of said coating layers contains chlorine, wherein a concentration of said chlorine in said coating is at least 0.0001 percent by mass and no more than 1 percent by mass, and wherein said second layer is formed closer than said first layer toward the substrate.”

The Applicants submit that the applied references, either singularly or in combination, fail to teach the unique combination of features recited in claim 13, nor do they disclose or suggest the synergistic results of such a combination of features. For example, as noted in paragraph [0022] of the present application, the presence of a compound containing the elements Al and Cr provides a coating having improved oxidation resistance and thermal conductivity. As a result, heat generated during cutting can escape from the coating surface, thereby making the coating suitable for application where the coating surface can reach high temperatures.

Furthermore, the presence of chlorine in at least one of the coating layers, whose concentration is at least 0.0001 percent by mass and no more than 1 percent by mass provides unexpected results and a dramatic increase in oxidation resistance as shown in Tables 3-5 and paragraphs [0059], [0063], and [0068]. For example, compare the results listed in Tables 3-5 for Example 33 (which is the same as Example 15 shown in Table 1) with the results for Comparative sample 8 (which is the same as Comparative sample 4 in Table 2), which are the same except for the inclusion of chlorine in Example 33. As can be seen in Table 3, for example, the inclusion of chlorine in the coating increased the tool life evaluation **from 2400 cut holes** in Comparative sample 8 without chlorine, **to 12,160 cut holes** in Example 33 with chlorine. Such features are not disclosed or even suggested in the applied art.

In addition to the above, it is noted that claim 13 recites a first layer that contains a compound formed from elements Al and Cr, and a second layer that contains a compound that is formed from elements, which do not include Al. A layer that is formed by an AlCr compound is hard but brittle. Claim 13 also recites that the second layer is formed closer than the first layer toward the substrate, which provides improved adhesion as a result of the second layer being provided in between the hard and brittle first layer and the substrate. This improvement can be seen by comparing Example No. 4 with Example No. 15, and by comparing Example No. 5 with Example Nos. 14 or 17 in Table 1. Thus, such features provide a good layered coating.

The Office Action cites both of the *Yamamoto et al.* references (hereinafter referred to as the ‘601 patent and the ‘658 patent) for the teaching of all of the features of claim 13, but indicates that these reference do not explicitly include the claimed chlorine. The Applicants note that the ‘601 patent mentions that a target used to form a hard film should preferably contain no more than 0.2 mass percent chlorine (see column 3, lines 35-40), and backs up this statement by noting in Tables 23 and 24 that higher mass percentages of chlorine produce a slightly

unstable state of discharging during film forming (see column 39 lines 26-67 and column 41, lines 25-43). Similar statements are made in the ‘658 patent. (See column 3, lines 55-62, Tables 20 and 21, column 36, lines 50-67, and column 37, lines 42-60.) The remaining examples discussed in these references (see, e.g., Tables 14 and 16 of the ‘601 patent) do not disclose the use of chlorine therewith, but rather the presence of chlorine is merely described as an impurity at the end of the disclosures thereof, and, as such, is meant to be limited if not eliminated from films. Thus, while these references discuss the effect of chlorine impurities on discharge conditions during film forming operation, they do not discuss or even appreciate the beneficial and unexpected results of the claimed range of chlorine in at least one of the coating layers recited in independent claim 13 of the present application.

Ueda et al. describes a coated carbide alloy cutting member that has a cemented carbide substrate and one or more hard coating layers including an aluminum oxide-based layer that contains 0.005 to 0.5 percent by weight of chlorine. The Office Action suggests combining the teaching of the chlorine range mentioned in *Ueda et al.* with the teachings in the ‘601 patent and the ‘658 patent; however, the ‘601 and ‘658 patents clearly indicate that a chlorine impurity that exceeds 0.2 mass percent should not be used as stated in column 3, lines 35-40, column 39 lines 26-67, and column 41, lines 25-43 of the ‘601 patent and in column 3, lines 55-62, column 36, lines 50-67, and column 37, lines 42-60 of the ‘658 patent. Thus, these reference teachings teach away from the combination thereof, and one of ordinary skill in the art would not have had an expectation of success when combining such teachings since they appear to be contradictory over the majority of the ranges discussed. Furthermore, *Ueda et al.* does not appear to link the presence of chlorine to oxidation resistance benefits and the dramatic results set forth in the present application, and thus does not identify the chlorine as a result effective variable to achieve such unexpected results.

Hitachi Tool describes a titanium nitride-aluminum film coated tool that is constituted so as to impart tensile residual stress to a titanium nitride-aluminum film, to make a crystal structure as a cubic phase and to contain chlorine by 0.01 to 2 mass percent. The Office Action suggests combining the teaching of the chlorine range mentioned in *Hitachi Tool* with the teachings in the ‘601 patent and the ‘658 patent; however, the ‘601 and ‘658 patents clearly indicate that a chlorine impurity that exceeds 0.2 mass percent should not be used as stated in column 3, lines 35-40, column 39 lines 26-67, and column 41, lines 25-43 of the ‘601 patent and in column 3, lines 55-62, column 36, lines 50-67, and column 37, lines 42-60 of the ‘658 patent. Thus, these reference teachings teach away from the combination thereof, and one of ordinary skill in the art would not have had an expectation of success when combining such teachings since they appear to be contradictory over the vast majority of the ranges discussed. Furthermore, *Hitachi Tool* does not appear to link the presence of chlorine to the oxidation resistance benefits and the dramatic results set forth in the present application, and thus does not identify the chlorine as a result effective variable to achieve such unexpected results.

Thus, the Applicants submit that the applied references, either singularly or in combination, fail to teach the unique combination of features recited in claim 13, nor do they disclose or suggest the synergistic results of such a combination of features. The seemingly contradictory teachings in the applied references with respect to chlorine would have taught away from the combination thereof, and such teachings would have lead one of ordinary skill in the art to believe that such a combination would not have a reasonable likelihood of success possibly due to differences in compounds or processes used in the various references.

Accordingly, Applicants respectfully request the withdrawal of the anticipation and obviousness rejections with respect to pending claims 13-15 and 17-19.

Therefore, the present application is believed to be in condition for allowance. Favorable reconsideration is respectfully requested. If any unresolved issues remain, it is respectfully requested that the Examiner telephone the undersigned attorney at (703) 519-9957 so that such issues may be resolved as expeditiously as possible.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 504213 and please credit any excess fees to such deposit account.

Respectfully Submitted,

July 23, 2008
Date

/Christopher D. Ward/
Christopher D. Ward
Attorney/Agent for Applicant(s)
Reg. No. 41,367

918 Prince Street
Alexandria, VA 22314
Tel. (703) 519-9957
Fax. (703) 519-9958